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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,857	02/09/2004	Ryan Fung	ALT.P027.1 (A1182.1)	9489

27296 7590 02/23/2006

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EXAMINER	
TAT, BINH C	

ART UNIT	PAPER NUMBER
2825	

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

EV

Office Action Summary	Application No.	Applicant(s)	
	10/774,857	FUNG ET AL.	
	Examiner	Art Unit	
	Binh C. Tat	2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to application 10/774857 file on 12/09/05.

Claim 1-55 remain pending in the application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin Kuoching (US Patent 6349402).

3. As to claims 1, and 33, Lin Kuoching teaches a method for designing a system, comprising: determining minimum and maximum delay budgets for connections by finding a set of connection delays that attempt to satisfy the short-path and long-path timing constraints (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67); and selecting routing resources for the connections in response to the minimum and maximum delay budgets (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

4. As to claims 2, and 34, Lin Kuoching teaches wherein determining minimum and maximum delay budgets comprises considering lower and upper delay limits of routed connections based on potential routing possibilities (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51 and background).

5. As to claims 3, and 35, Lin Kuoching teaches wherein lower delay limits of the routed connections are determined based on an initial selection of routing resources that minimizes connection delays and ignores shorted signals (see fig 4, fig 5 col 4 line 50 to col 6 line 29).

6. As to claims 4, and 36, Lin Kuoching teaches wherein determining minimum and maximum delay budgets comprises starting with initial estimates of final routed delay (see col 2 line 38 to col 3 line 43).

7. As to claims 5, and 37, Lin Kuoching teaches wherein estimates of final routed delay are determined based on an initial selection of routing resources for connections that minimizes connection delay (see col 2 line 38 to col 3 line 43).

8. As to claims 6, and 38, Lin Kuoching teaches wherein estimates of final routed delay are determined based on an initial selection of routing resources for connections that ignores shorted signals (see col 2 line 38 to col 3 line 43 and summary).

9. As to claims 7, and 39, Lin Kuoching teaches wherein the short-path and long-path timing constraints are provided by a user (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

10. As to claims 8, and 40, Lin Kuoching teaches wherein determining minimum and maximum delay budgets for the connections comprises allocating short-path and long-path slack (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

11. As to claims 9, and 41, Lin Kuoching teaches wherein allocating the delay in order to satisfy the long-path and short-path timing constraints comprises: performing short-path timing analysis to determined short-path slack values (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67); fixing any short-path violations determined by the short-path

timing analysis budgets (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67); performing long-path timing analysis to determine long-path slack values (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67); and fixing any long-path violations determined by the long-path timing analysis budgets (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

12. As to claims 10, Lin Kuoching teaches wherein fixing any short-path violations comprises adding delay in response to the short-path slack values and connection weightings (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

13. As to claims 11, Lin Kuoching teaches wherein the connection weightings are determined by a unit weighting scheme (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

14. As to claims 12, Lin Kuoching teaches wherein the connection weighting is determined based on how much delay can be added before a practical limit is reached or all relevant violations are resolved (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

15. As to claims 13, Lin Kuoching teaches wherein fixing any long-path violations comprises subtracting delay in response to the long-path slack values and connection weightings (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

16. As to claims 14, and 42 Lin Kuoching teaches wherein allocating the long-path and short-path slack comprises: performing long-path timing analysis to determine long-path slack values (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67); allocating long-path slack determined by the long-path timing analysis (see fig Fig. 4, fig 5 col 3 line 44 to col 5

line 24, Especially, col 4 lines 50-67); performing short-path timing analysis to determine short-path slack values; and allocating short-path slack determined by the short-path timing analysis (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

17. As to claims 15, Lin Kuoching teaches wherein allocating long-path slack comprises adding delay to temporary delays in response to the long-path slack values and connection weightings (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

18. As to claims 16, Lin Kuoching teaches wherein the connection weightings are determined by a unit weighting scheme (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

19. As to claims 17, Lin Kuoching teaches wherein the connection weighting is determined based on how much delay can be added before a practical limit is reached or all relevant slack is allocated (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

20. As to claims 18, Lin Kuoching teaches wherein allocating short-path slack comprises subtracting delay from temporary delays in response to the short-path slack values and connection weightings (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

21. As to claims 19, and 43, Lin Kuoching teaches wherein selecting routing resources for connections in response to the minimum and maximum delay budgets comprises re-selecting the routing resources for connections whose current proposed routes do not meet the minimum and maximum delay budgets (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

22. As to claims 20, and 44, Lin Kuoching teaches wherein selecting routing resources for connections in response to the minimum and maximum delay budgets comprises re-selecting the routing resources for connections that are shorted (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary).

23. As to claims 21, and 45, Lin Kuoching teaches wherein selecting routing resources for connections in response to the minimum and maximum delay budgets comprises decreasing minimum delay budgets based on the number of routing iterations that have occurred (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

24. As to claims 22, and 46 Lin Kuoching teaches wherein selecting routing resources for connections in response to the minimum and maximum delay budgets comprises increasing maximum delay budgets based on the number of routing iterations that have occurred (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67).

25. As to claims 23, and 47, Lin Kuoching teaches wherein selecting routing resources for connections in response to the minimum and maximum delay budgets comprises utilizing a cost function (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary).

26. As to claims 24, Lin Kuoching teaches wherein the cost function scores routing resources as candidates for selection in completing a connection route (see col 2 line 38 to col 3 line 43).

27. As to claims 25, Lin Kuoching teaches wherein the lowest cost routing resource is efficiently tracked via use of a heap (see col 2 line 38 to col 3 line 43).

28. As to claims 26, Lin Kuoching teaches wherein the cost function for a routing resource is based, in part, on the delay of the respective routing resource (see col 2 line 38 to col 3 line 43).

29. As to claims 27, Lin Kuoching teaches wherein the cost function for a routing resource is based, in part, on a prediction of the delay to reach the destination from the respective routing resource (see col 2 line 38 to col 3 line 43).

30. As to claims 28, Lin Kuoching teaches wherein the cost function for a routing resource is based. in part, on how the total estimated routing delay of the connection if the routing resource is used compares with the minimum and maximum delay budget of the connection.

31. As to claims 29, Lin Kuoching teaches wherein the cost function for a routing resource is based, in part, on the number of competing signals that want to use the respective routing resource (see fig 11, fig 12 paragraph 0060-0061 and summary).

32. As to claims 30, Lin Kuoching teaches further comprising increasing the penalty associated with several competing signals wanting to use the same resource in the cost function as connection re- routing attempts occur (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary).

33. As to claims 31, Lin Kuoching teaches further comprising increasing the penalty associated with several competing signals wanting to use the same resource in the cost function, based, in part, on how many signals wanted to use the resource in previous routing attempts (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary).

34. As to claims 32, Lin Kuoching teaches further comprising increasing the penalty associated with several competing signals wanting to use the same resource in the cost function, based, in part, on how many routing iterations have occurred (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary).

35. As to claims 48, Lin Kuoching teaches a system designer, comprising: a slack allocator unit that generates minimum and maximum delay budgets for connections from long-path and short-path timing constraints; and a routing unit that selects routing resources in a system to route the connections in response to the minimum and maximum delay budgets (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

36. As to claims 49, Lin Kuoching teaches wherein the slack allocator comprises a timing analysis unit that generates long-path and short-path slack values for the connections in response to connection delays and the long-path and short-path timing (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

37. As to claims 50, Lin Kuoching teaches wherein the slack allocator comprises a delay adjustment unit that modifies a set of temporary connection delays in order to attempt to satisfy the long-path and short-path timing constraints (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

38. As to claims 51, Lin Kuoching teaches wherein the slack allocator comprises a delay adjustment unit that modifies a set of temporary connection delays to allocate long-path and short-path slack (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

39. As to claims 52, Lin Kuoching teaches wherein decreasing minimum delay budgets based on the number of routing iterations that have occurred comprises decreasing the minimum delay budgets of connections that are competing for routing resources other connections want (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary).

40. As to claims 53, Lin Kuoching teaches wherein increasing maximum delay budgets based on the number of routing iterations that have occurred comprises increasing the maximum delay

budgets of connections that are competing for routing resources other connections want (see fig Fig. 4, fig 5 col 3 line 44 to col 5 line 24, Especially, col 4 lines 50-67 and summary)..

41. As to claims 54, Lin Kuoching teaches wherein the cost function for a routing resource is based, in part, on the delay incurred reaching the respective routing resource from the connection source (see fig 1, 4, 5 col. 2 line 37 to col 3 line 31 and col. 5 lines 25 to col 6 line 51).

42. As to claims 55, Lin Kuoching teaches wherein the prediction of the delay to reach the destination from the respective routing resource is based, in part, on the minimum and maximum delay budget (see col 2 line 38 to col 3 line 43).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh C. Tat whose telephone number is 571 272-1908. The examiner can normally be reached on 7:30 - 4:00 (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew Smith can be reached on 571 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Binh Tat
Art unit 2825
Nov. 3, 2006

Thuan Do
Primary examiner.
02/20/2006